



Case Study

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Montefiore Medical Center: Integrated Care Delivery for Vulnerable Populations

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ABSTRACT: Montefiore Medical Center, an academic medical center in New York City, has created an integrated system of care for its primarily low-income patients. This patient-centered system of hospitals, community clinics, and school-based clinics uses innovative practices for managing chronic disease, provides access to high-quality specialty hospital care, and employs targeted care management and robust health information technology in support of integrated care. Although close to 80 percent of its payer mix is Medicaid and Medicare, Montefiore has been able to achieve financial and organizational sustainability. Factors that contribute to this success include: care management that allows for integration across the system; building successful primary care that combines traditional and new models; and medical systems that focus on population health and community accountability.



OVERVIEW

The health care safety net serves a critical role in ensuring that America's most vulnerable populations—those with low incomes and those without health insurance—receive both emergency and ongoing care. According to the Institute of Medicine (IOM), however, there is a growing disparity between high-performing, economically successful safety-net providers and the larger group of struggling systems.¹ The IOM has also cited a need for increased federal tracking of the changes in the health care safety net.² To address this gap, The Commonwealth Fund has increased its efforts to study the safety net to identify examples of high-performing systems and to offer a broader look at emerging strategies for delivering, financing, and managing care for vulnerable populations.³

This case study describes how Montefiore Medical Center, a not-for-profit academic medical center in the Bronx borough of New York City, has created a patient-centered system of care that tailors its access, delivery, and infor-

mation systems to the unique needs of the primarily low-income, vulnerable populations it serves. In recent years, the medical center has sharpened its focus on the needs of the community and the patient and redoubled its emphasis on performance improvement. At the same time, Montefiore has achieved financial stability. These achievements have been realized in a community where one of four adults is uninsured, most patients have low incomes and complex needs, and insurance coverage is predominantly through Medicaid and Medicare (which together make up more than 75 percent of system revenues). Specifically, the innovations undertaken by Montefiore:

- focus on better management of chronic diseases through ambulatory and primary care strategies that extend access to multiple points in the community;
- provide access to high-quality specialty and hospital care; and
- create greater integration of care delivery through the application of targeted care management and robust health information technology.

It is hoped that the insights offered in this case study will be useful to safety-net systems, academic medical centers, and other stakeholders as they struggle to deliver and finance care for vulnerable populations.

MONTEFIORE'S COMMUNITY, STRUCTURE, AND ORGANIZATION

Established in 1884 as a hospital for patients with chronic illnesses, most notably tuberculosis, Montefiore Medical Center serves 500,000 residents of the Bronx and adjacent Westchester County. The Bronx is one of the poorest urban counties in the nation, where one-quarter of the adult population is uninsured and carry the burdens of disease associated with poverty: obesity, hypertension, cardiovascular disease, asthma, hepatitis C, and HIV. More than 400,000 of the Bronx's approximately 1.4 million residents are children, almost half of all residents identify themselves as Latino/Hispanic, and nearly 36 percent identify themselves as African American (Exhibit 1). In addition, hundreds of thousands of undocumented persons live in the borough.

As evident in its stated mission, vision, and values, Montefiore addresses the intense challenges

Exhibit 1. Selected Population Characteristics for the Bronx and New York City

Indicator	Bronx	New York City
Poor or fair health	27%	16%
Low birthweight	9.6%	8.0%
Teen birth rate (per 1,000)	52	28
Uninsured adults	25.6%	19%
Children in poverty	38%	20%
Single-parent households	23%	10%
Black or African American	35.6%	15.6%
Hispanic or Latino	48.4%	16.4%
Disabled	28.4%	11.2%
Speak language other than English at home	52.7%	28.9%
Median family income	\$30,682	\$50,643
Families below poverty level	28%	14.2%

Sources: County Health Rankings, Snapshot 2010: Bronx, <http://www.countyhealthrankings.org/new-york/bronx>. U.S. Census Bureau, American FactFinder, <http://factfinder.census.gov>.

Montefiore Medical Center's Mission, Vision, and Values

Mission: To heal, to teach, to discover, and to advance the health of the communities they serve

Vision: To be a premier academic medical center that transforms health and enriches lives

Values: Humanity, innovation, teamwork, diversity, and equity

Source: Montefiore Medical Center.

faced by its patient population through a commitment to patient-centered care that meets the access challenges and social needs of vulnerable populations.

Although Montefiore's size makes innovation and integration difficult, it also gives the system the power to reach thousands of patients. The system includes four hospitals, with a total of 1,491 beds: Henry and Lucy Moses Division (620 beds); Jack D. Weiler Hospital and Albert Einstein College of Medicine (396 beds); Children's Hospital of Montefiore (106 beds); and North Division, acquired in 2007 (369 beds). These four hospitals account for 86,500 inpatient discharges, 301,000 emergency department visits, and 7,100 births annually.

Montefiore also includes 21 community-based primary care clinics (including five federally qualified health centers) that are located throughout the borough and provide 830,000 visits annually; 17 school-based clinics that provide medical, mental health, and dental services, with a total of 65,000 annual visits to 40 schools (many schools, particularly high schools, are clustered at the same site); and a care management organization with 150,000 enrollees in capitated contracts that provide a fixed payment per enrollee. Exhibit 2 provides a map showing the location, type, and penetration of Montefiore services in the Bronx and Westchester County.

Montefiore employs 17,382 staff, including 3,070 nurses, 1,625 physicians, and 1,200 medical residents and fellows. There are an additional 1,000 voluntary (independent, community-based) physicians on staff. The health system employs the faculty of Albert Einstein College of Medicine, who practice,

teach, and conduct research. The Albert Einstein College of Medicine, founded with a commitment to biomedical science, education, and social justice, has been affiliated with Montefiore since 1967. In 2009, a new 10-year affiliation agreement was signed between Montefiore and the medical school, with the goal of creating an institutional partnership that aligns teaching and research efforts.

Given the poor and elderly patient population it serves, Montefiore is heavily dependent on government coverage programs for financial stability. Medicare accounts for 39 percent of Montefiore's patient volume, and Medicaid accounts for 40 percent. (In 2007, most safety-net hospitals relied on Medicaid funding for approximately 33 percent of their patient volume,⁴ according to the National Association of Public Hospitals.) Self-pay patients constitute 1 percent of inpatient care and 7 percent of ambulatory care volume. The remaining volume comes from a commercially insured population, including many New York City employees and labor union members. The system receives no direct subsidies from federal, state, or municipal governments. Its total disproportionate share hospital payments—federal funds provided to preserve access to care for elderly and low-income populations by financially assisting the hospitals they use—are approximately \$145 million annually: \$100 million from Medicare and \$45 million from Medicaid.

With such a high proportion of lower-income, medically complex, and government-insured patients, safety-net hospitals often struggle just to break even. In contrast, Montefiore has been able, despite its challenges, to achieve a positive financial position: in 2009 the system had an operating margin of 1.3 percent and a total margin of 2.5 percent. Montefiore president and CEO Steven Safyer, M.D., attributes the success to efficiencies, innovation, the depth and breadth of specialty services, and patient-centered care. Montefiore's average inpatient length of stay has dropped from 8.7 days in 1993 to 5.4 days in 2009, compared with 7.2 days for New York State hospitals and 6.7 days for New York City hospitals.

Montefiore Integrated Delivery System



Employing Physicians to Increase Supply in Poor Communities

Over the past 25 years, Montefiore Medical Center has employed a large number of specialist and primary care physicians in response to the challenges in the 1970s and 1980s, when many private physicians left the Bronx. Montefiore also has built relationships with many of the remaining voluntary physicians in the borough. Working with this combination of employed and voluntary physicians enabled the growth of the integrated delivery system. “We wanted to attract dedicated physicians who shared our values and met the highest standards of practice,” says Dr. Safyer. Many of these employed physicians hold academic appointments at the Albert Einstein College of Medicine.

After a significant investment in primary care by Montefiore, the Bronx now has 106 primary care

physicians per 100,000 population, which, although below the New York State rate of 148 per 100,000 population,⁵ has risen 15 percent since 1999.

Montefiore has also been growing its specialty services to meet the needs of the community. Dr. Safyer believes that physicians are attracted to Montefiore because of its academic excellence combined with the community mission; half of the employed staff completed medical school or residency training at Einstein-Montefiore and remained to practice in the Bronx. Dr. Safyer trained at Montefiore, as did the chief medical officer and the medical director. “High-performing medical schools, like Einstein, need to take responsibility for their community,” says Dr. Safyer.

“Physicians who are trained here prefer to focus on what the patient needs, rather than on the insurance they have.”

Recruiting and retaining an adequate number of specialist physicians, particularly in medicine, surgery, obstetrics, and psychiatry, remains a challenge for the system. To address this, Dr. Safyer and Montefiore's leadership have recently built centers of excellence for liver transplants, neuroscience, heart surgery, and children's specialties, and they have recruited over 70 physicians for these areas.

Developing a Fully Owned Care Management Organization

In 1995, Montefiore worked with its employed and voluntary physicians to establish an integrated provider association (IPA) to align the medical center and its physicians around assumption of financial risk and improvement of care delivery. The IPA board includes hospital and physician representation, with the latter including employed, voluntary, primary care, and specialty physicians. The process of creating an IPA was made somewhat easier because many of the primary care and specialty physicians on the medical staff were salaried. Still, overall it was a hard sell, as physicians were skeptical of financial risk and managed care.

Managed care had a bad name because of the assumption that it involved managing price, not care. And specialty physicians were hesitant about the emphasis on primary care it entailed. "At first, there was suspicion. To build trust, we gave the physicians a voice in decisions," Dr. Safyer explained. "Then the subspecialists started to realize that if we increased compensation to the primary care physicians, it would bring more patients into the system. As a result, the specialists began to look at the network and financing more holistically. Overall, we got the medical staff to engage in the finances and the strategy."

The IPA assumes financial risk from health plans in all lines of business (Medicare, Medicaid, and commercial), typically receiving less than 90 percent of the member premium to manage the medical, financial, and administrative services for members. In 1996, Montefiore established CMO, The Care Management Company as a wholly owned subsidiary. CMO manages the risk for the IPA and the medical center. It pro-

vides care management, customer service, provider relations, and claims processing services under delegated arrangements with the health plans.

Approximately 6 percent to 7 percent of the IPA premium is used to support the care management infrastructure. Currently, Montefiore has 150,000 patients enrolled in capitated contracts, and has not only achieved financial health but continues to grow its capitated business. (Specific innovations, strategies, and outcomes are discussed later in this paper.)

Building an Enhanced Electronic Health Record

Montefiore began developing its health information technology (HIT) system in 1995. Since then, it has invested close to \$200 million to create a system that extends throughout its delivery network. Montefiore's clinical information system includes inpatient, ambulatory, laboratory, imaging, and pharmacy systems, as well as a data warehouse and patient portal.

Montefiore continues to modify its information system to improve care and patient safety in collaboration with IT specialists, physicians, nurses, and other clinicians. In 1999 the inpatient service fully implemented computerized physician order entry (CPOE). An electronic sign-out system was developed to standardize patient care handoffs among inpatient units, the emergency departments, and the ambulatory network. The system also facilitated the activation of emergency protocols for conditions such as heart attack, stroke, and hypothermia.

To make better use of clinical data, Montefiore developed a data warehouse, Clinical Looking Glass (CLG), in 2000. CLG accesses Montefiore's data systems to enable searches of aggregated data and to provide performance reports and support for clinical research. More than 700 staff have been trained to use CLG, including all internal medicine residents. CLG permits assessment of performance by physician, department, or site of care. For example, an individual report card on diabetes care was developed for all primary care residents; the report card is used as a tool to improve care.

CHRONIC DISEASE MANAGEMENT: FROM HOSPITAL AMBULATORY CARE TO COMMUNITY-BASED INNOVATIONS

Leadership at Montefiore Medical Center has focused on building primary care at their hospital and clinic sites to meet the complex needs of vulnerable populations. At the same time, it has reached out to the community to better understand patients' needs and to create solutions involving strong community partnerships, public health, and social services that reach beyond traditional medical care.

Patient-Centered Primary Care to Increase Access and Continuity

Patient-centered medical homes are intended to provide preventive and primary care for patients with acute and chronic health care needs, coordinate necessary specialty care, and follow up on recommended testing. With early evidence suggesting they have the potential to improve quality, reduce costs, and narrow disparities in patient care, The Commonwealth Fund has contributed to the development of primary care medical homes in pilot sites nationwide.⁶ For vulnerable populations, medical homes are intended to increase access to primary care and reduce avoidable emergency department (ED) visits.

Montefiore is working toward establishing model patient-centered medical homes at two of its primary care centers—Family Health Center and Bronx East. Though still in development, specific efforts have focused on medical, administrative, and social initiatives such as:

- Family Health Center has expanded its hours to two evenings a week and one Saturday a month to better meet the needs of patients who need after-hours care. This year the center plans to extend these hours to four evenings a week and four Saturdays a month.
- Many safety-net clinics operate on a drop-in basis where patients arrive unscheduled and wait their turn for care. They see the first available provider and often wait hours for care. To reduce long waits and to increase continuity of care, the Family

Health Center team holds 50 to 75 same-day appointment slots open each day to accommodate patients with urgent care needs. This represents 40 percent to 50 percent of total daily visits, with the highest available on Mondays.

- In 2009, only 50 percent to 65 percent of patients saw their regular primary care physician during a visit at Family Health Center. Increasing the number of patients who see the same physician consistently is another strategy for providing continuity of care. In an effort to improve performance, Bruce Soloway, M.D., vice chair, Department of Family and Social Medicine, and Jose Delgado, M.H.A., administrative director, Family Health Center, are working to restructure staff into teams and manage patients as a population. The challenge, according to Dr. Soloway, continues to be providing continuity in an academic teaching practice where most physicians are practicing part time. “We have 60 percent continuity compared to 90 percent for other practices,” he says. “We’re trying to improve this by using multidisciplinary teams instead of individual physicians in our care.”
- Montefiore has used IT to facilitate access to care. Family Health Center utilizes a Web portal (MyMontefiore.com) so that patients can contact medical staff by e-mail to renew prescriptions, ask questions, and receive referrals. Approximately 10 percent of the Family Health Center’s patients are accessing this system. The ambulatory electronic health record (AEHR) is the primary vehicle for collecting patient information and having it accessible for other providers. Like the inpatient clinical information system, the AEHR can be viewed by caregivers throughout the system.
- To address the nutrition challenges faced by this vulnerable population, particularly those related to obesity, staff conduct healthy cooking demonstrations in the clinic waiting room. They also employ health educators who run a reading program for children. To help address cultural competency issues in the neighborhood, the center actively

recruits and retains staff of Hispanic, Cambodian, and Vietnamese descent.

“A blend of high-tech and low-tech fixes is what makes us successful with our population,” says Dr. Safyer. Family Health Center is applying for Medical Home designation through the National Committee for Quality Assurance (NCQA) in 2010. In recognition of the rigorous requirements to achieve this designation, New York State has enhanced Medicaid rates for primary care practices with NCQA medical home designation. “Our goal is to try to figure out how to pay for the things we see our patients need,” says Noel Brown, M.D., director of quality initiatives for the Montefiore Medical Group. “We become social entrepreneurs.” If successful, leadership plans to replicate the strategies piloted at Family Health Center at other sites.

Improving Diabetes Care Through Collaboration

Montefiore’s Diabetes Leadership Group brought clinicians and staff from across the delivery system to improve care for diabetes, which affects 12 percent of adults in the Bronx. The initiative involved senior management, clinicians, and staff from across the system, and it included nutrition and education outreach programs provided in the community.

In 2009, Montefiore executive leadership designated diabetes outcome improvements as one of the year’s annual goals. A multispecialty leadership group was assembled with representation from critical care, ambulatory, community clinics, school clinics, discharge social workers, and care managers. The team created standards of care for glycemic control, protocols for managing blood sugar in the intensive care unit, and targets for minimizing unnecessary testing on the inpatient floor.

The diabetes initiative encompasses neighborhood- and home-based efforts focused on nutrition and education:

- Outreach workers have designed education materials to communicate with the diverse needs of the population based on cultural, language and education-level needs.
- The team worked with the local parks department to offer free recreation center memberships to identified diabetics.
- Montefiore leadership started a weekly farmer’s market on Montefiore grounds to offer vegetables and fruit to the neighborhood and has partnered with community groups to support the presence of green markets throughout the Bronx.
- Five certified diabetic educators rotate through Montefiore Medical Group sites to provide education and counseling to support patient self-management. The chronic care management program at the CMO also provides centralized support to the educators for ongoing patient support between office visits.

Results to date show statistically significant reductions in inpatient glucose levels, without an increase in rates of hypoglycemia. In the outpatient setting, rates of glycemic control across ambulatory sites exceed published benchmarks. In 2008, the proportion of NCQA commercial plan beneficiaries with poor glucose control (hemoglobin A1c level over 9%) was 28 percent and among Medicaid plans was 45 percent. At Montefiore, only 14 percent of patients had a hemoglobin A1c over 9 percent for all fee-for-service and capitated payers. In 2009, the average hemoglobin A1c level for patients with diabetes in Montefiore’s primary care network was 7.3 percent, and 51 percent had levels below 7 percent.

Improving Asthma Care in the Hospital and the Community

Phillip Ozuah, M.D., Ph.D., chairman of Pediatrics at Montefiore, has focused on improving asthma care and outcomes for children in the Bronx. He analyzed internal Montefiore data and discovered that one admission was a predictor for being in the persistent category of asthma severity, which can show a need for chronic

- The CMO sends individual letters to patients it manages with an A1c level greater than 9 percent.

care. So, rather than waiting for a follow-up visit from the primary care physician, which caused delay in restarting maintenance treatment, the pediatric department changed its internal protocols to have the asthma controller drugs (not just rescue medication) given and prescribed at discharge. This intervention combined with provider education has driven down readmission rates to the Children's Hospital at Montefiore.

Focused work on improving asthma care has been extended to the community as well. Montefiore partners with the New York City Department of Education (DOE) to provide primary care in the Bronx public schools. Both organizations believe that providing basic primary care to children regardless of ability to pay would improve health and increase the likelihood of school completion. The DOE provides the space in schools, and Montefiore provides full-time primary care services, including medical, mental, dental, and community health, in 40 elementary, middle, and high schools.

During the 2008–2009 school year, 23,402 children were seen in these clinics, with 77 percent of all students in the participating schools enrolled in the program. Funding is provided through Medicaid (Montefiore receives fee-for-service Medicaid payments regardless of whether the child is enrolled in managed care), the Children's Health Insurance Program, private insurance, and grants from the federal Health Resources and Services Administration and the New York State and City health departments. Elementary school children with asthma who attended schools with a Montefiore clinic had a 50 percent reduction in hospitalizations and ED visits and a three-day per year improvement in attendance compared with asthmatic children in schools without a Montefiore clinic.^{7,8}

Medical Training That Focuses on Chronic Care and Social Needs

The patient population at Montefiore has complex medical and social conditions, and staff are expected to go beyond traditional medicine to find solutions for these complicated issues. For example, Jeffrey Weiss,

M.D., medical director at Montefiore, requires medicine residents to call at-risk patients at home within 72 hours after discharge from the emergency department. In this way, the residents are expected to make a personal connection and begin to understand the home environment and challenges their patients face.

Residents also are chosen in accordance with this social mission. According to Mary Duggan, M.D., director of Montefiore's Department of Family Medicine's residency program, applicants are ranked on a scale that includes clinical skills and their ability to use the tools of social medicine to try to affect the social determinants of health. Staff also demonstrate strong ties to the health system and the community. Nearly two-thirds of Montefiore's employees live in the Bronx. The average retention rate for nurses is 17 years, and the nurse turnover rate in 2009 was 8.06 percent.

Extending Access into the Community

Dr. Weiss and his team have focused on improving care for the most frequent users of the emergency department. To determine what circumstances could be behind the high use rate, his team conducted a 2006 randomized study of 60 (of about 600) chronic ED users. The team surveyed patients as well as the ED physicians, nurses, and residents who had been in contact with those patients. It found that unstable housing, substance abuse, and a psychiatric diagnosis were the strongest risk factors for repetitive ED use. As a result of these findings, staff created the Navigator program to determine appropriate follow-up for frequent ED users in order to meet their additional clinical, social service, and other needs. Staff also created a system that flags these high users upon arrival and then begins making plans for discharge to a transitional housing unit (provided there are no serious medical needs).

Care for the Homeless

Individuals who are homeless or at high risk for becoming homeless often seek care in the ED. To assist these individuals in receiving care and avoiding ED visits, Montefiore provided medical services on-site in

the Bronx's homeless shelters and through mobile clinics for a total of 25,000 visits last year. Starting in 2009, Montefiore, in partnership with community-based organizations, began assigning a social worker to these individuals when they came to the ED. The social worker determines what services they require and how best to meet their needs. According to Anne Meara, R.N., associate vice president of Network Care Management, this initiative grew out of the demands observed in the ED and reflects the tenacity of the mission-driven staff.

Tackling Obesity

Montefiore leadership also focused on development of public health initiatives in the community. With an estimated 40 percent of Bronx children overweight or obese, Montefiore staff, working with the public school district, started a campaign to bring low-fat milk into schools. They began with the schools where Montefiore operates clinics; the program has since been implemented citywide. Replacing whole milk with low-fat milk saved 4.6 billion calories and 422 million grams of fat in aggregate for New York City school children in 2009 compared to 2004, while overall milk consumption rose slightly.⁹

SPECIALTY AND HOSPITAL CARE THAT PROVIDE ACCESS TO HIGH-QUALITY SERVICES FOR LOW-INCOME POPULATIONS

Expanding Access for Hepatitis C Patients in the Bronx

The Bronx has one of the highest rates of hepatitis C in the country. Hepatitis C is the leading cause of liver failure in the United States, and the most common indicator for liver transplantation. Along with expanding community outreach programs, primary care, and specialist management services of the disease, Montefiore has developed a Transplantation Center of Excellence to offer liver transplants to Bronx residents. Montefiore began the liver transplantation program in August 2008 and has performed 29 adult and pediatric transplants since then. Prior to 2008, 75 Bronx residents had to leave the borough for liver transplant and

its associated treatments. Montefiore leadership believes it is important to allow patients to stay in the borough for this complex care because they are more likely to receive continuity of care and culturally appropriate services.

Emergency Department Innovations

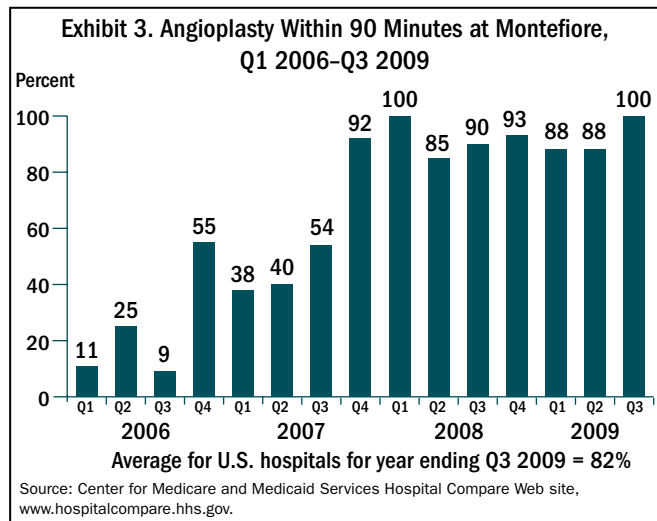
Low-income, uninsured, and Medicaid patients rely more on the emergency department than do people with Medicare or private coverage.¹⁰ Use of the ED is a challenge facing any safety-net hospital, and the high ED volume at Montefiore makes this particularly challenging. The annual total volume of emergency department visits at Montefiore has grown to 301,000; the average number of ED visits for safety-net hospitals nationwide is 74,226.¹¹ Volume at Montefiore's ED continues to grow, with an almost 350 percent increase since 1995. The average increase for hospital visits in New York City, New York State, and the United States overall has remained at less than 50 percent increases over this time period.

Staff attribute this increase to their culture of respecting the unique needs of Montefiore's population while pushing toward higher quality, efficiencies, and appropriate access. "We believe this is in part because of our culture of being respectful to patients," says John Gallagher, M.D., chair of Emergency Medicine. "We see EDs losing volume at other Bronx hospitals while ours continues to grow. We think this is because of word of mouth that you will get great care here and you will be treated well."

With over 100 patients in the Moses Division ED at any given time and 3,000 visits weekly, triage has become a priority in order to separate and appropriately treat nonurgent and emergency cases. Lower-acuity patients, approximately 30 percent of the total, are triaged into a separate area for fast tracking. Patients who are discharged from the ED are called by ED staff within 72 hours of their visit for follow-up and referral.

Specific efforts have focused on improving ED care for cardiac patients. Since 2006, Montefiore has improved its "door-to-balloon" rate—when a

patient with a heart attack is moved within 90 minutes from the ED to the cardiac catheterization lab for an angioplasty to open the affected coronary artery—from 11 percent in 2006 to 88 percent–100 percent in 2009 (Exhibit 3).



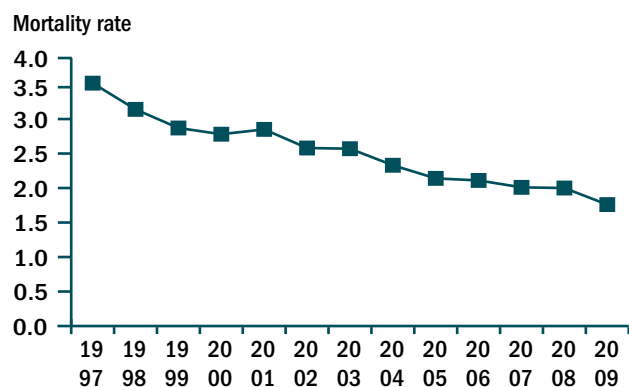
Montefiore’s quality improvement team developed an intervention, applicable to all patients, that had a common starting point in the ED. The previous process required the ED physician to notify a cardiology fellow, who then notified the cardiology attending physician, with additional team members—such as nurses and lab technicians—notified by other means. At the quality improvement team’s recommendation, Montefiore invested in a dedicated phone network for use in managing heart attack patients, with one phone in the ED and one carried by all cardiology catheterization team members. The phone network provides immediate access and conference capabilities, allowing for mobile and concurrent communication among team members. In addition, all team members carry dedicated pagers, which are activated when an ED physician clicks a desktop heart attack notification icon on an ED computer. Finally, the team’s nursing leadership created an all-inclusive bundled heart attack medication and equipment kit for use in preparing patients in the ED, saving valuable time in locating and dispensing specific medications.

The improvement in primary angioplasty performance has enabled reductions in acute myocardial infarction (AMI) mortality rates. In the recent public report on the federal Centers for Medicare and Medicaid Services (CMS) Hospital Compare Web site, Montefiore’s AMI mortality rates (14.0%) were significantly lower than the national average (16.6%).

On hospital clinical quality measures reported by CMS (and compiled on the Commonwealth Fund Web site WhyNotTheBest.org), Montefiore performed better than the national average on composite measures of evidence-based treatment for heart attack and heart failure during the reporting period July 2008 through June 2009. Likewise, on measures of 30-day mortality for heart attack and heart failure, the system exceeded average performance for the nation, New York State, and the Bronx referral region. On the national Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) survey, Montefiore rated higher than average for New York State and the Bronx referral region on most measures of patients’ experiences with care, and exceeded the average for both the nation and for safety-net hospitals on an overall measure of whether patients would recommend the hospital. Montefiore sees continuing opportunity for achieving higher levels of performance on these and other measures reported by CMS. The system continues to focus on improvement, as is evident in their door-to-balloon initiative and other efforts.

For more than a decade, Montefiore’s emergency department has used only emergency medicine board-certified physicians in each ED, as well as dedicated nursing staff; previously the department was staffed primarily by moonlighting physicians with minimal emergency medicine training. As a result, according to Dr. Gallagher, the system has seen reductions in mortality rates in Montefiore emergency departments for the three adult hospitals. Overall crude mortality rates have decreased from 3.52 percent in 1997 to 1.76 percent in 2009 (Exhibit 4). Because it is difficult to find standardized measures of overall hospital mortality rates, Montefiore benchmarks off its

**Exhibit 4. Crude Mortality Rate (per 1,000)
in Montefiore Emergency Departments, 1997-2009**



Source: Montefiore emergency departments at Moses, Weiler, and North.

own performance and strives to measure improvement over time.

While meeting the demands of its population is a critical area of focus for Montefiore leadership, challenges continue. Montefiore, now with the largest ED in New York State, continues to see its ED expand despite efforts to increase primary care and urgent care access. To meet the ever-increasing demand, the health system added 7,000 square feet, more doctors and nurses, and “comfort rounds,” which feature customer service representatives who offer patients a pillow, free snacks, and child care to respond to patient needs. The hospital does not receive a different urgent care payment rate for those who present at the ED with nonemergent cases.

Diffusing Critical Care Expertise Throughout the Hospital

Within the inpatient setting, Montefiore has focused on integrating critical care expertise into medical-surgery units outside of the intensive care unit (ICU). This strategy brings critical care services to the bedside throughout the hospitals to ensure appropriate use of the ICU beds. Ten years ago, Vladimir Kvetan, M.D., director of Critical Care at Montefiore, recognized that some ICU beds were occupied by end-of-life patients and others who often did not benefit from the high-level staffing and intensive treatment in the ICU. Rather, what patients often needed was the clinical skills of well-trained physicians. With this in mind,

Dr. Kvetan developed a system where the clinical knowledge and decision-making of the intensivist physician can be taken to patients wherever they are located in the hospital.

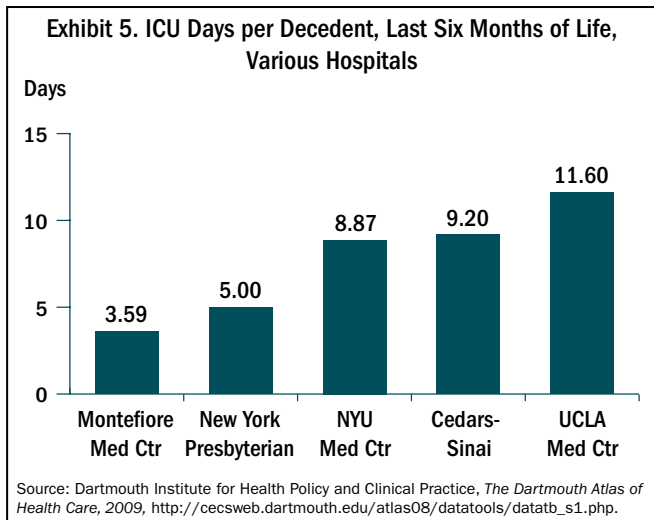
He created the “ICU without walls” initiative that provides rapid response by a critical care medicine expert systemwide. Intensivists trained in critical care, palliative care, family care, and bioethics are part of a team that provides medical consultations and triage 24 hours a day, seven days a week. The team is not limited to specific consultants or to one area of the hospital.

Each morning at 7:00, the multidisciplinary team of physicians, residents, and other care providers meets to discuss each patient, followed by the critical care consult team in various hospital units and in the ICU. On average, there are over 100 such patients daily. The team discusses a plan of care which is then entered into a network ICU database with an acuity rating and the name of the supervising attending physician responsible during that shift. All decisions for these patients are made by the attending physician, rather than a resident, to ensure higher-quality, expert care.

As a result of this innovation, staff have been able to substitute ongoing basic services for highly sophisticated critical care medicine throughout the hospital. Results have been significant:

- Annual critical care consultations have fallen 20 percent over the past few years from a high of about 5,000 to about 4,000, a result of staff being trained to provide better care to high-risk patients throughout the hospital.
- The round-the-clock presence of board-certified intensivists caring for patients in and out of the ICU has been a significant contributor to a 40 percent decrease in inpatient mortality in the past decade, according to Montefiore leadership.
- Overall mortality rates at Montefiore have fallen from 3.5 percent in 1997 to 1.76 percent in 2008.
- ICU days for patients during the last six months of life are lower at Montefiore than at other compara-

ble hospitals (Exhibit 5), and hospital leadership believes this is in large part because of their approach to providing critical care that is patient-based rather than unit-based.



Dr. Kvetan's team is currently training other specialists, such as obstetricians and pulmonologists, in critical care medicine to integrate these clinical skills and services deeper into the system. Dr. Kvetan has taken teams of physicians and residents to developing nations to train them on how to provide critical care to patients with very little technology. "It's not the technology, it's the people," he says. "It is this philosophy that has transformed critical care at Montefiore."

TARGETED CARE MANAGEMENT AND ROBUST HEALTH INFORMATION TECHNOLOGY CREATE INTEGRATED CARE DELIVERY

Using Care Management to Manage Chronic Conditions

Though the 150,000 individuals who are enrolled in the CMO represent only one-third of Montefiore's total patient population, the care management organization has served as an incubator for developing systemwide strategies to manage chronic disease, improve quality of life, reduce hospitalizations, and create efficiencies.

The CMO's quality improvement strategy brings monitoring of chronic conditions into the patient's home through its telehealth program. For its

managed patients, the CMO has created a telehealth program focused on diabetes and congestive heart failure. Patients use an electronic device in their home to respond to 10 questions regarding health and functional status. Some responses trigger alerts for nonclinical staff, who hand off to clinical staff if necessary.

- Use of telemonitoring tools has resulted in 9 percent to 32 percent decreases in annual costs compared with the year before enrollment in disease management.
- For a nine-month period in 2009, in nearly 200 patients over 70 years of age who were discharged from the hospital, nurse phone calls directed at identifying gaps in care and providing patient education resulted in a reduction of the 30-day readmission rate for that patient group from 19.9 percent to 13.2 percent.
- In 530 patients enrolled in the CMO house calls program, hospital admissions, emergency department visits, and total costs were reduced by one-third after a year. These gains have been sustained after two years.

Many of the network management skills are translated across the Montefiore system and managed by Anne Meara, R.N., associate vice president, Network Care Management. These skills include overall discharge planning, translational services, chronic disease management, care transitions, patient education, credentialing, disease management, and medical home models.

One of the systemwide priorities has been to increase access to care, according to Ms. Meara. The CMO operates a contact center staffed by 100 service representatives that assists patients in making appointments at MMG sites and in radiology and the dental service. "If a patient calls in to request a radiology appointment, we can look at the entire network for available spots and find an open appointment," said Ms. Meara. The centralized system has improved live-answer reach rates by more than 50 percent and has reduced no-show rates in some primary care sites by as much as 18 percent through automated reminder

calls. The contact center handled over 1 million calls in 2009 and facilitated over 5,000 physician referrals. The phone system supported by the CMO and the electronic information system processed another 6 million referrals, including specialty appointment scheduling.

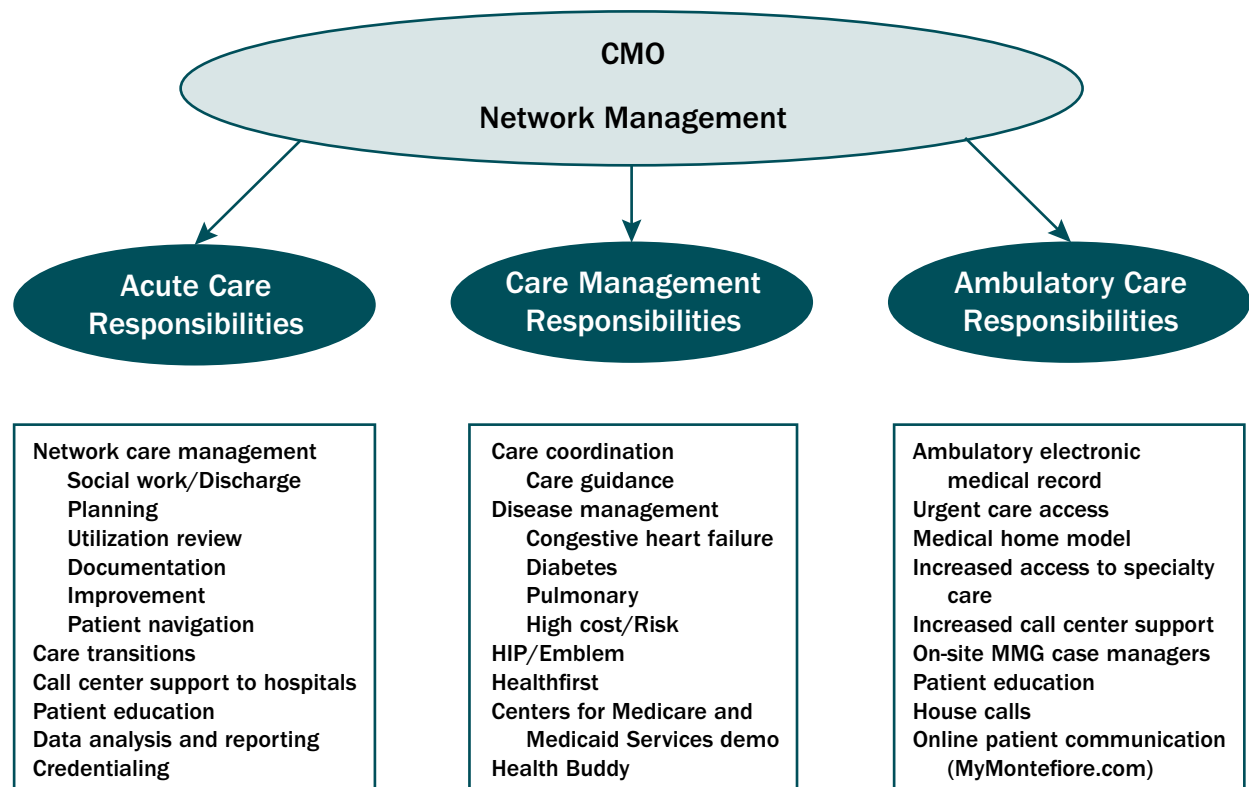
The CMO uses its network management expertise to focus on coordinating and improving care for patients across the continuum of acute and ambulatory care. As Exhibit 6 illustrates, Montefiore staff use their network managers to, for example, help coordinate care transitions, provide patient education, manage chronic disease, increase access to specialty care for ambulatory care patients, and provide on-site case managers at clinic sites. The exhibit also illustrates that the skills of network management developed by the CMO are carried forward and integrated throughout Montefiore's delivery system into multiple care settings.

Using Health Information Technology to Improve and Integrate Care

Each patient in the Montefiore network has a unique patient identifier that is tied to his or her lifetime electronic health record. The unique patient identifier is used throughout the Montefiore network. Once a patient is identified, the EHR is used to track multiple visits, monitor prescribing patterns (all drugs are entered via computerized physician order entry, or CPOE), and verify the identity of the patient for medication administration in the hospitals.

According to Gary Kalkut, M.D., M.P.H., senior vice president and chief medical officer at Montefiore, before CPOE, "there were 40 manual steps involved from a physician writing an order until it was administered by a nurse. All of these had the potential for human error. In 2000, we showed that CPOE and electronic pharmacy dispensing systems reduced potential medication errors by 80 percent.

Exhibit 6. Network Cross-Functional Cutter



Getting the right drug to the right patient is our absolute priority. With the addition of bar coding the patient identifier for each medication administration, our research demonstrates that we avert an additional one to three potential errors per day.”

The IT team also implemented a secure, HIPAA-compliant, Internet-based messaging service (branded MyMontefiore.com) to improve communication between patient and provider. Patients can communicate with the practice offices and can e-mail their providers to discuss nonemergent issues, to receive confidential responses and lab results, and to request appointments and prescription refills. Currently, 16 percent of ambulatory care patients are using this portal (more than 47,000 patients are registered), and 750 physicians participate. In 2009, the system sent and received a total of 147,000 messages, with message volume increasing by the month.

According to Dr. Weiss, many physicians were hesitant to use this service, believing that their patients were not using the Internet and worried that they would be overwhelmed with requests. To control the volume and appropriateness of communications, physicians invite the patient to join, and physician assistants or other staff triage the e-mails. When physicians come to work in the morning, they open their computers and see messages along with clinical records, making the experience more efficient than traditional telephone messages.

Montefiore’s inpatient EHR is fully operational at the Children’s Hospital and the Moses and Weiler divisions. Implementation at the recently acquired North Division is in progress. The ambulatory electronic health record (AEHR) is being implemented at multiple primary care and specialty sites. The plan is to have 70 practice locations fully operational with AEHRs by the fourth quarter of 2011. Montefiore and its IT vendors are working on interoperability of the ambulatory and inpatient systems, including single sign-on for all patient care systems.

In the ambulatory setting, physicians and administrators use the Clinical Looking Glass technology to develop provider-specific reports on patients

with diabetes. At Family Health Center, for example, each physician receives a diabetes registry that tracks each patient’s services, such as date of his or her last hemoglobin A1c test, cholesterol test, and blood pressure reading, with results. The physician receives all individual patient results and can compare the patient’s experience to that of the group averages for their patient panel and for the clinic site overall. “We’ve had to work to overcome resistance from providers saying ‘this is not my patient,’” says Dr. Kalkut, “by agreeing on a definition of a primary care physician [PCP] in our system and ensuring that the attribution is correct.” Montefiore is piloting additional registries for congenital heart disease, hypertension, asthma, smoking status, hepatitis C, and chronic kidney disease.

Assuring that patient attribution to the correct physician is accurate and showing physicians their detailed patient panel data help to dispel the myth that “my patients are just sicker,” Dr. Kalkut says. Providers can query the system using Clinical Looking Glass for their specific panel to look at; for example, glucose control levels for their patients over time. CLG is able to define the time period that a patient has been in the desired glucose range and correlate performance with associated medications, weight, adherence to office visits, and intercurrent illness.

Dr. Kalkut expects that making these tools available to Montefiore physicians will motivate them to look into their own practice patterns and find ways to improve. If queries are driven by the individual physician as a complement to institutional performance reports, Dr. Kalkut believes the fundamentals of practice will begin to change. “We are looking for a cultural shift.”

Montefiore leadership has spearheaded efforts to collaborate with other health systems in the Bronx around data-sharing. Launched in 2005 and initially chaired by Dr. Safyer, the Bronx Regional Health Information Organization (RHIO) is the vehicle for a Bronx-wide electronic exchange of health care information. There is widespread participation in the RHIO, including most of the borough’s hospitals, federally qualified health centers, ambulatory health centers,

home care agencies, nursing homes, and community-based organizations. Every provider organization has one vote regardless of size, a strategy intended to put every organization on equal footing as well as to foster consensus and shared leadership.

The group formed an independent nonprofit organization with \$15 million from the State of New York and matching contributions from participating systems based on their operating budgets. The goal is to share technology and information and address the needs of the Bronx patient population in a collaborative manner. “The Bronx RHIO is currently focused on sharing information,” says Dr. Safyer, “but the goal is to do more than that.”

Montefiore hopes to create an accountable care organization and will work with the RHIO and other partners to create real-time exchange of clinical information, demonstrate the value of patient-centric models of care (such as the use of patient assessments and individual care plans), and create a legal structure that allows for sharing of incentive payments.

THEMES AND INSIGHTS

Despite an exceptionally challenging patient and payer mix, Montefiore Medical Center has been able to achieve financial and organizational sustainability. It has done this by adopting care management processes that allow for integration across the system, by combining traditional and new models of primary care, and by focusing on population health and community accountability. Still, challenges to sustainability remain. Reducing reliance on the emergency department has been problematic. And while health information technology is improving care, Montefiore has experienced difficulties with integrating health HIT systemwide.

Integration Through Care Management

Montefiore’s care management population accounts for only about one-third of its systemwide patient volume. However, leadership is able to use the strategies developed through the care management organization to improve care throughout the system. The capitation

payment gives an otherwise extremely tight system (operating with a 1.3 percent margin) a bit of flexibility to develop creative approaches to managing care. For example:

- Discharge planning staff at the hospital are managed by the CMO network vice president, who has moved them beyond traditional discharge planning duties and has nurses calling patients at home to provide patient education after discharge. Leadership has seen this approach reduce readmissions.
- The telehealth program developed by the CMO monitors Montefiore patients with chronic diseases in their homes. The early intervention that is provided as a result has reduced the need for hospital care.
- Efficiencies in and greater access to specialty care have also sprung from CMO initiatives. This streamlined specialty care appointment scheduling to a central location for all Montefiore providers, allowing them to find open slots anywhere in the system and reduce waiting times.

The CMO allows for increased coordination, efficiency, and quality, creating greater integration across the spectrum of home, primary, specialty, and hospital care.

Disease is not isolated to a point of care. Therefore, treating a population where there is such high prevalence of chronic disease requires an integrated approach that extends across settings. Montefiore’s quality improvement strategies take advantage of the integrated delivery system by providing incentives for quality improvement, pushing the mission-driven, patient-centered approach to multiple segments of the system, and continually seeking creative strategies for persistent problems.

Building Up Primary Care

Montefiore has taken full advantage of its high penetration of primary care clinics and academic excellence in the Bronx to create primary care that responds to the unique needs of its patients. Hours have been extended to night and weekend sessions to meet the

needs of a population that works nontraditional hours and has limited resources to take time off from work or find extra child care. Medical residents have been trained in social determinants and health and have built these skills into their practices: patient education is provided on-site in nutrition, chronic disease management, and even basic literacy. A uniquely designed Web portal allows patients to communicate with medical staff via e-mail, and the AEHR can be viewed by providers system-wide. Though still in the pilot stages, this patient-centered primary care model will be rolled out to all Montefiore clinics over the next year or two.

In addition, Montefiore takes its primary care services to nontraditional sites, investing staff and time in creating school-based clinics throughout the Bronx and in bringing primary care to homeless shelters. These make use of the primary care network built through academic excellence and training to improve access to these services for vulnerable populations, both within their traditional walls and in the community as well.

Focusing on Population Health and Community Partnership

Montefiore leadership and staff show tenacity and creativity as they work aggressively to find approaches that will improve access and quality for their complex patients. Achieving success has required clinical improvements—such as reducing door-to-balloon rates and expanding critical care outside of the ICU—but it also has required an understanding of the nonmedical needs of vulnerable patients. “We realize that a patient’s socioeconomic conditions contribute to their disease burden,” says Dr. Safyer.

Montefiore has adapted the traditional hospital-based medical model in order to create an approach that is equally focused on population health and social supports. This is evident in the practice of requiring medical residents to call discharged ED patients, in their social determinants training, and in their diabetes initiatives that focus on community nutrition and exercise.

Extending beyond the hospital walls and even beyond the community clinics is a strategy critical to Montefiore’s success. Leadership has recognized that they must bring access to vulnerable populations instead of relying only on patients to come to their institutions for care; this is evident through their use of school-based clinics, services in homeless shelters, and telemedicine in the homes of those with chronic conditions. These strategies, along with institutionally based efforts, have led to improved care for the conditions where disparities are the greatest, such as asthma, diabetes, and heart disease.

Medical center leadership has also led efforts to extend work into the community by collaborating with other area hospitals around data-sharing, with schools to provide primary care, and with neighborhoods to offer healthy food choices. Leadership has recognized the value of collaboration and has partnered formally and informally with other Bronx health systems and the City and State of New York.

Managing Emergency Department Demand by Vulnerable Populations

Most safety-net health systems face strains on their EDs. Montefiore has worked to improve quality in its ED and to realize efficiencies that will allow it to find capacity for the high-end specialty cases that can improve financial performance and appeal to its academic faculty interests. Nationally, safety-net EDs struggle with how to meet the needs of nonurgent cases, and many hospitals cite a lack of access to primary and specialty care as reasons for the high proportion of nonurgent care sought in EDs.¹² Montefiore has worked to improve efficiencies and increase access to primary care, but still its ED visits grow. Studies suggest that efforts to improve nonurgent services, through fast-tracking, for example, increase patient volume.¹³

Montefiore continues to face the competing challenges of responding to patient demands while looking for ways to decrease routine ED volume. The organization’s impression is that expansion of evening and weekend hours at the primary care sites and the

opening of the urgent care center at Bronx East have handled some of the demand for urgent, same-day care needs.

Health Information Technology Leads to Quality Improvement but Full Integration Is Challenging

Montefiore's clinical HIT systems have been vital to the development of critical care outside the ICU, allowing physicians to view their individual performance with regard to their patient panel; and to enhancing overall provider-patient communication through a Web portal.

Still, challenges exist in integrating inpatient and outpatient information. Implementing the EHR in Montefiore's primary care sites has been slow. Staff must be trained and workflows adapted to accommodate both the data access, data entry, and reporting requirements of the system, and to take advantage of the tools the system offers. Fully integrated communication between primary care and hospital settings is still not possible within one EHR.

Montefiore leadership has not been able to find a single EHR that meets the needs of its complex system. Even in an integrated model where clinics are owned by the delivery system and where most physicians are system employees, sharing information between diverse clinical settings is challenging. "Integration is key," says Dr. Kalkut, "and you can't go to a computer store to find an HIT system that can address asthma, transplants, and other conditions that move across the delivery system. We have to build what we need ourselves."

Partly because of Montefiore's size and partly because of its complex patient population, a seamless electronic information system is taking time. Only 16 percent of patients are currently using the Web portal developed for patient and provider communication. Nationally, only about 25 percent of low-income people have access to the Internet, so building utilization of the service will be challenging.

The ambulatory electronic health record is currently being implemented at primary and specialty sites throughout the system. It is still not possible to look at a single record for both ambulatory and inpatient care, although there are multiple interfaces between systems. The organization has had great success with its provider-specific reporting for ambulatory care, using the Clinical Looking Glass technology it developed. CLG has helped Montefiore improve diabetes care and has helped physicians drill down to areas that need additional clinical intervention.

CONCLUSION

Low-income, vulnerable populations are historically complex to care for, and the systems that dedicate themselves to this service often remain in precarious financial and organizational positions. Montefiore Medical Center has built an integrated system of high-quality primary, specialty, and inpatient health care for half a million residents of the Bronx. Its leadership has met the exceptional challenges of serving a disproportionately poor and sick population by: using data and internal inquiry to redesign processes and improve care; extending access to its population beyond traditional settings; partnering with government, schools, other provider systems, and neighborhoods to extend access and improve the health of the community at large; and building specialty centers of excellence that extend access to complex care for vulnerable populations and attract high-quality physicians. The result is a system of care that, despite considerable payer mix challenges and complex patient needs, remains fiscally healthy and able to provide the full spectrum of care to vulnerable populations.

NOTES

- ¹ M. E. Lewin and R. J. Baxter, “America’s Health Care Safety Net: Revisiting the 2000 IOM Report,” *Health Affairs*, Sept./Oct. 2007 26(5):1490–94.
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- ³ See also R. Nuzum, D. McCarthy, A. Gauthier, and C. Beck, *Denver Health: A High Performing Public Health Care System* (New York: The Commonwealth Fund Commission on a High Performance Health System, July 2007); and D. McCarthy and K. Mueller, *The New York City Health and Hospitals Corporation: Transforming a Public Safety Net Delivery System to Achieve Higher Performance* (New York: The Commonwealth Fund Commission on a High Performance Health System, Oct. 2008).
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- ⁵ <http://www.countyhealthrankings.org/new-york/bronx>.
- ⁶ A. C. Beal, M. M. Doty, S. E. Hernandez, K. K. Shea, and K. Davis, *Closing the Divide: How Medical Homes Promote Equity in Health Care—Results from the Commonwealth Fund 2006 Health Care Equity Survey* (New York: The Commonwealth Fund, June 2006).
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- ¹¹ Zaman, Cummings, and Siegel Spieler, *America’s Public Hospitals*, 2009.
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- ¹³ Ibid.

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The aim of Commonwealth Fund–sponsored case studies of this type is to identify institutions that have achieved results indicating high performance in a particular area of interest, have undertaken innovations designed to reach higher performance, or exemplify attributes that can foster high performance. The studies are intended to enable other institutions to draw lessons from the studied institutions' experience that will be helpful in their own efforts to become high performers. It is important to note, however, that even the best-performing organizations may fall short in some areas; doing well in one dimension of quality does not necessarily mean that the same level of quality will be achieved in other dimensions. Similarly, performance may vary from one year to the next. Thus, it is critical to adopt systematic approaches for improving quality and preventing harm to patients and staff.

